ABSTRACT

A pseudo-chaotic coding/modulation method. The coding method exploits symbolic dynamics of a chaotic map at the transmitter to encode data. The encoding synthesizes the chaotic map based upon the data to be transmitted. In a preferred embodiment, pseudo-chaotic iterates are generated from a digital implementation of a Bernoulli shift map. The output of the shift map is translated by a mapping, preferably implemented by a digital signal processor, to allow transitions between states in a transmitted signal to differ, and the translated map is used to drive a modulator (for example PPM, FSK, PSK, QAM, etc.). In the specific case of pulse-position modulation (PPM) the translated map is used to modulate pulse train positions within a periodic synchronization frame. The preferred embodiment uses a shift register to implement an approximation of the Bernoulli shift map acting as a form of convolutional code with a number of states equal to the symbolic states defined on the chaotic map. A receiver may use fewer states and still decode the data signal, allowing receiver scalability.